

WHAT IS CLAIMED IS:

4 1. A method of determining a path from a source node to a destination node through a
5 network, comprising:
6 grouping structures in a network into structure groups, wherein each structure
7 group comprises at least two nodes;
8 determining virtual circuit information for every pair of nodes in said structure
9 groups;
10 determining connections between said structure groups; and
11 determining a least cost path from said source node to said destination node
12 using at least said virtual circuit information and connection information.
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15 2. The method of claim 1, wherein the structures in said structure groups have the same
16 set of office locations.
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19 3. The method of claim 1, wherein said virtual circuit information includes information
20 regarding whether a path using a common channel is available through said structure.
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23 4. The method of claim 3, wherein a path using a common channel between a pair of
24 nodes having time division multiplexing capability is available when the same time
25 slot is available throughout a path between said nodes.

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2 5. The method of claim 3, wherein a path using a common channel between a pair of
3 nodes having wavelength division multiplexing capability is available when the same
4 frequency is available throughout a path between said nodes.

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7 6. The method of claim 1, wherein a cost is associated with each node in the network
8 and with each link that connects a pair of nodes in the network, and wherein said least
9 cost path determination considers the cost of the nodes and links visited on a path.

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12 7. The method of claim 6, wherein the cost of a node is increased when a signal changes
13 channels at said node.

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16 8. The method of claim 7, wherein a link may be an express link or a local link, and the
17 cost of an express link is less than the cost of a local link.

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20 9. The method of claim 1, wherein said least cost path determination uses a Dijkstra
21 algorithm.

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2 10. The method of claim 1, wherein said least cost path may use SONET/SDH equipment,
3 PDH equipment, and dense wavelength division multiplexing equipment.
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6 11. A method of planning a path through a network, comprising:
7 receiving a request for a path through a network of structure groups between a
8 source node and a sink node;
9 determining virtual circuit information for each structure group in said
10 network; and
11 determining a path through said network using said virtual circuit information.
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14 12. The method of claim 11, wherein nodes in said network may be connected by links,
15 and wherein said virtual circuit information is determined using a data set containing
16 information on the availability of channels in said links.
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19 13. The method of claim 12, further comprising the step of updating said data set to
20 reflect that said path is no longer available.
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23 14. The method of claim 11, wherein the virtual circuit information includes the number
24 of paths using a common channel through said structure group between any pair of
25 nodes.
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2 15. The method of claim 14, wherein said request includes the bandwidth desired, and

3 wherein a path through a structure group is available only if a path having the desired

4 bandwidth is available.

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7 16. The method of claim 14, wherein a slot-edge matrix is maintained for each data

8 structure, and wherein the availability of a channel is determined based on said slot-

9 edge matrix.

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12 17. The method of claim 16, wherein said request also includes a time period requested,

13 wherein a slot-edge matrix is maintained for various requestable time periods, and

14 wherein the availability of a channel is determined based on the slot-edge matrix for

15 the time frame requested.

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18 18. The method of claim 11, wherein said virtual circuit information for each path through

19 a structure group includes the number of nodes visited on said path.

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22 19. The method of claim 11, wherein said request includes the type of service desired, and

23 wherein said step of determining a path through said network selects a path using the

24 desired service type.

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27 20. The method of claim 19, wherein said type of service may be SONET service.

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1 21. The method of claim 11, wherein said network is a fiber-optic network.

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4 22. The method of claim 11, wherein said virtual circuit information includes two pseudo

5 nodes for each group node.

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